

Title: Uncertainty Estimation & Propagation in SIRTf Pipelines

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Abstract:

In the course of reducing raw data from SIRTf into properly calibrated science products, many automated pipelines are utilized. In a typical pipeline, instrumental signatures are successively removed and previously computed calibration values are applied. For such a large-scale automated process one needs to assess quantitatively the results of data reduction to facilitate quality assessment, for example to verify that requirements are met. Furthermore, higher level science products such as point source extraction or mosaicking are dependent on trustable estimates of uncertainties in the data. In addition, it is essential that the end-user is supplied with statistically meaningful measures of confidence in the quoted fluxes or positions to allow full scientific utilization. For these reasons all of SIRTf pipelines have been designed to estimate and propagate uncertainties in each step. This paper will discuss the methods that we have adopted for estimating and propagating uncertainties. Our approach has been based on sound statistical reasoning while taking into account the implications of inherent uncertainties in the characterization of the instrumental signatures that we are trying to remove.

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